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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,393	07/01/2005	Hiroyuki Yanagi	1806.1008	6350
21171	7590	12/12/2007	EXAMINER	
STAAS & HALSEY LLP			ZIMMER, ANTHONY J	
SUITE 700			ART UNIT	
1201 NEW YORK AVENUE, N.W.			PAPER NUMBER	
WASHINGTON, DC 20005			4116	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/541,393

Applicant(s)

YANAGI ET AL.

Examiner

ANTHONY J. ZIMMER

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
- Paper No(s)/Mail Date 2/13/2007, 10/04/2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status

1. Claims 1-7 are pending and are subject to examination.

Information Disclosure Statement

2. The information disclosure statements (IDSs) submitted on 2/13/2007 and 10/04/2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Hinako et al. (JP2002-219362, hereafter D1, translation and drawings attached—see PTO-892).

D1 teaches a silica supported (ammoxidation) catalyst containing the metal oxides of molybdenum, vanadium, antimony, and niobium where the silica carrier is present in 40% by weight. See example 1, paragraph [0042] of D1. D1 teaches the catalyst with a particle diameter of from 5-200 μm comprising at least 90% by weight of the catalyst. See Drawing 2 of D1 (there are no particles larger than 200 μm or smaller than 5 μm). The catalyst of D1 also has a pore size distribution wherein the pore volume of the pores having a pore diameter of 80 Å or less comprises less than 20% of the total pore volume and the pore volume corresponding to pores having a diameter of over 1000 Å is less than 20% of the total pore volume. See Drawing 1 of D1. Note, the preamble of claim 1 includes intended use, i.e. "for use in producing acrylonitrile...fluidized bed reactor," which does not impart patentable distinction to this composition. See MPEP 2112.02.

In regard to claim 3, D1 teaches using a silica carrier using 100% of a silica sol having a diameter of less than 50 nm. See paragraph [0023] and abstract of D1.

In regard to claim 4, D1 teaches making a mixture comprising silica and molybdenum, vanadium, antimony, and niobium (by first making an aqueous mother liquor comprising molybdenum, vanadium, and antimony and adding this liquor to a mixture comprising silica and niobium) with said silica comprising a 100% of a silica sol having a diameter of less than 50 nm (See paragraph [0023]

of D1), spray drying the mixture, and calcining the mixture. See paragraphs [0034]-[0036] of D1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 2 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1, as applied to claim 1 above, in view of Umemura et al. (US4264476, hereafter D2).

D1 teaches the elements of claim 1. See 102 rejection above. However, D1 does not teach the composition as required by claim 2. D1 does disclose using iron and bismuth in composition as required by claim 2, but does not teach the presence of an alkali metal in the composition in the given proportions required by claim 2. In particular, D1 teaches a catalyst shown by the formula

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$\text{Mo}_1\text{V}_a\text{Sb}_b\text{Nb}_c\text{Z}_d\text{O}_n$ where Z is at least one of a list including Fe and Bi;
 $0.1 \leq a \leq 1$, $0.01 \leq b \leq 0.6$, $0.01 \leq c \leq 0.3$, and $0 \leq d \leq 1$. See claim 6 and paragraph [0014] of D1. The instant claim presents the composition relative to 12 atoms of Molybdenum, when adjusting the formula of D1 to present the composition of D1 on a 12 Mo atom basis, the formula reads $\text{Mo}_{12}\text{V}_a\text{Sb}_b\text{Nb}_c\text{Z}_d\text{O}_n$
 $1.2 \leq a \leq 12$, $0.12 \leq b \leq 7.2$, $0.12 \leq c \leq 3.6$, and $0 \leq d \leq 12$. This falls within the scope of claim 2 in regard to bismuth and iron when Z is Fe and Bi and $d=1.5-12$ —this was found by adding the ranges of a and b in claim 2 and comparing with the range available for d in the formula of D1.

Though D1 does not teach the presence of sodium, potassium, rubidium, or cesium; it would have been obvious to one of ordinary skill to add one of these metals as specified in D2 (in a ratio of 0.01-1 atoms of the alkali metal to 10 atoms of Mo, or 0.012-1.2 atoms of the alkali metal to 12 atoms of Mo). See abstract of D2. One of ordinary skill in the art would have been motivated to make the modify D1 by adding an alkali metal in the given ratio in order to increase the selectivity of the catalyst to acrylonitrile and to keep the yield to acrylonitrile high. See D2 column 3, lines 50-53.

It would have been obvious to one of ordinary skill in the art to chose Fe and Bi as catalyst components as the presence of both iron and bismuth in a catalyst is known in the art to increase conversion to acrylonitrile and the presence of iron is known in the art to increase the selectivity of the conversion to acrylonitrile. See D2, column 3, lines 26-46.

In regard to claim 6, D1 teaches using the catalyst for the ammoxidation of propane or isobutene, but does not teach using the catalyst for the oxidation (in the presence of molecular oxygen) of propene or isobutene with ammonia. However, it would have been obvious to one of ordinary skill in the art to use the catalyst as described in claim 1 for the reaction with molecular oxygen (oxidation) of ammonia and propylene as it is known from D2 (and well known and common in the art) to use catalysts of this type (comprising molybdenum and other metal oxides) for the reaction with molecular oxygen (oxidation) of ammonia and propylene to affect the predictable result of producing acrylonitrile. See D2 column 1 lines 7-13 and column 2 lines 13-51.

In regard to claim 7, D1 teaches using the catalyst produced by the process of claim 4 for the ammoxidation of propane or isobutene, but does not teach using the catalyst for the oxidation (in the presence of molecular oxygen) of propene or isobutene with ammonia. However, it would have been obvious to one of ordinary skill in the art to use the catalyst as produced in claim 4 for the reaction with molecular oxygen (oxidation) of ammonia and propylene as from it is known from D2 (and well known and common in the art) to use catalysts of this type (comprising molybdenum and other metal oxides) for the reaction with molecular oxygen (oxidation) of ammonia and propylene to affect the predictable

result of producing acrylonitrile. See D2 column 1 lines 7-13 and column 2 lines 13-51.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over D1 in view of Sasaki et al. (US4370279, hereafter D3).

In regard to claim 5, D1 teaches the limitations of claim 4, but fails to teach a calcination comprising a preliminary calcination (at a temperature of 150-430°C) and final calcination (at 450-750°C). However it would have been obvious to one of ordinary skill in the art to modify D1 in view of D3 as D3 teaches using a preliminary calcination (at a temperature of 200-600°C) and a final calcination (at a temperature of 600-950°C). One of ordinary skill in the art would have been motivated to modify D1 in view of D3 in order to sufficiently activate the catalyst. See D3 column 9, lines 48-59.

Conclusion

10. In sum, claims 1-7 are rejected, and no claim is allowed.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ajz

***/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4116***